students who have used the notes from which it is written. In this way it is possible for them to feel certain that, whatever may be the failings of their work, it will at least be intelligible to the average student.

The book opens with a preliminary chapter called "General Instructions," and the practical teacher at once becomes apparent in such paragraphs as that on the importance of *large* errors. No one can have had much experience in teaching practical physics without seeing that the anxiety of beginners to obtain correctness in the second or third place of decimals is accompanied by an extraordinary laxity in noting the tens and hundreds. In fact, it may be said that most of the inaccuracy of beginners in physical measurement is due to this cause. In the chapter on "Arithmetical Calculations," the authors rightly lay stress on contracted methods of multiplication and division. The short chapter on "Graphical Constructions" is less satisfactory than the others, and would probably be improved if some better examples of the method were employed, and if some notice were given to the convention (a most useful one) of making abscissæ represent the independent, and ordinates the dependent, variable.

The body of the book is taken up with experiments on mechanics (including measurement of density and specific gravity), heat, light, sound, and electricity. As necessarily follows from the nature of the case, there is not much that is original in the treatment of these subjects. One admirable feature, however, which runs throughout the course, is the working out of the percentage error in each experiment. In the section on heat, we notice that the calorimeter equivalent is found by pouring warm water into an empty calorimeter; more satisfactory results can generally be obtained by pouring warm water into a calorimeter containing some water at the temperature of the room, and calculating the difference between heat given out by warm water and that taken in by the cold. In this section is also to be noticed an ingenious form of heater for the determination of specific heats by the method of mixtures.

In the optical section the method of tracing rays by means of pins—first used, we believe, in the Cavendish Laboratory—is employed to a considerable extent. There is an experiment on the power of accommodation of the eye, which we have not seen before in any similar work.

The section on "sound" is concerned with the proof of the laws of vibrating strings, and an experiment on the resonance of a column of air. In the last three sections of the book, on "magnetism," "electric currents," and "electric charges," the authors seem to be less successful than in the earlier parts. But it is extremely difficult in the course of fifty pages to give a satisfactory series of experiments on these subjects, especially when, as in this case, a very large number of those pages are taken up with elementary explanations which might have been omitted by reference to any text-book, such as that of Thompson. And the form of water voltameter described is hardly, one would think, the most useful for laboratory purposes, or the most instructive from the point of view of the teacher.

In conclusion we may be permitted to suggest that, from an educational point of view, the book would gain if at the beginning of each experiment a short and clear statement of the object of that experiment were given. One of the most useful results to be obtained from a laboratory course such as this is gained when the student, knowing clearly the question which he is to address to nature, thinks out for himself how he is to proceed in his cross-examination, and compares his method with that of an experienced investigator. D. R.

OUR BOOK SHELF.

Bis an's Ende der Welt! Astronomische Causerien. By Prof. F. J. Studnička. Second enlarged edition. Pp. 212. (Prague: F. Simacek, 1896.)

THE author of this book went to Karlsbad to indulge in the special opportunities afforded by that town in the nature of its waters. During his stay there he made the acquaintance of several other "Kurgäste," by name Bausen, Bugajev, Carpenter, Parelli and Place, and his two friends from Prague, Benda and Naprstek. To pass away the time of their sojourn, these persons formed a small social circle, and, besides taking drives together, they met at stated times and discussed any subject that was uppermost in their minds. Carpenter, however, seemed, from all accounts, to be the dominating one of the party from the discussion point of view, and being of an astronomical turn of mind, the conversations generally were on this subject. His listeners were members of several different professions, so the subject had to be treated in an elementary manner, and, in consequence, the explanations had to be very clear.

The author of this book, who was one of the party, describes here the daily conversations which took place; they are mainly astronomical, although other subjects are occasionally referred to. The astronomical and physical problems dealt with are, for the most part, of a very general character, and will be found interesting reading.

A trip to Prague, after the stay in Karlsbad, gives the author a chance of referring somewhat in detail to the associations, works, and lives of Copernicus, Tycho Brahe, Kepler, Doppler, &c., all of whom were intimately connected with that town.

The book may be said to be quite suitable for the general reader, and the numerous diagrams and illustrations scattered throughout its pages will prove serviceable.

First Stage Inorganic Chemistry. By G. H. Bailey, D.Sc., Ph.D. Edited by William Briggs, M.A. Pp 210. (London: W. B. Clive, 1897.)

IT is too often forgotten, when criticising text-books written to follow the lines laid down in syllabuses, that the books are not so much to be blamed as the syllabuses. For convenience, it is considered necessary to state the subjects of which a student who presents himself for examination will be expected to know something. The text-book is then produced, in order that the student shall be able to acquire the knowledge in as easy a way as possible. If the syllabus is badly arranged, the text-book designed to meet it will be a bad one; but if the subjects in it are placed in an educational sequence, the text-book will partake of that good quality. Probably no one is better able to judge whether a syllabus hangs together properly or not, than a competent scientific writer who tries to build a book upon it.

The book before us has been arranged to meet the requirements of the Department of Science and Art for the Elementary Stage of Inorganic Chemistry. In eighteen short chapters the author deals with the general principles of chemistry, the nature of chemical reaction, the chief non-metals and their most important compounds, physical properties of gases, chemical nomen-

© 1897 Nature Publishing Group

clature, and chemical calculations. At the end of each chapter is a summary, and a number of questions to test the student's progress. Considerable attention is given to experiment, and the aims and purposes of the study of chemical science are brought into prominence. In fact, though the volume is one of a class of much-maligned text-books, and though it is intended for students working for examination, it is, nevertheless, a book which presents the rudiments of chemistry in a form which will make students appreciate the value of experiment as an instrument of scientific research.

Encyclopédie scientifique des Aide-Mémoire. Edited by M. Léauté. (Paris: Gauthier Villars et Fils. Masson et C^{ie}.)

THREE new volumes have recently appeared in this very serviceable series of technical handbooks. They are as follows:—

"Les Piles Électriques." By Ch. Fabry. This volume deals with the theory of the various electric cells, the measurement of the electromotive force and resistance of such cells, the construction of ordinary electric cells, and standard cells.

"Les Machines Thermiques." By Prof. Aimé Witz. Heat engines generally, steam engines, hot-air engines, and gas engines form the main subject of this volume. The object of the book is to institute a comparison between various heat machines, so as to bring into prominence the special characters of their respective cycles. Chapters are devoted to atmospheric machines, compressed-air machines, and freezing machines. Elementary students of thermo-dynamics will find the book interesting.

"Les Gaz de l'Atmosphère," by M. H. Henriet, is an excellent little volume on the chemistry of the atmosphere. The author is chemist at the Montsouris Observatory, and the methods of analysis described by him, as well as the results of investigations into the composition of the air at different places and at different times, makes his little book very valuable to meteorologists as well as chemists.

The Dahlia: its History and Cultivation. By various Writers. Pp. 81. (London: Macmillan and Co., 1897.)

THE history of the dahlia is told in this handbook by Mr. Richard Dean; the botany is described by Mr. John Ballantyne; the propagation and exhibition of the dahlia are dealt with by Mr. Stephen Jones; and the cultivation by Mr. Robert Fife; while Mr. William Cuthbertson, the editor of "Dobbie's Horticultural Handbooks," to which series the present volume belongs, contributes an introduction. The book is interesting to the botanist as well as the florist, and it should be possessed by every one who finds delight in cultivating dahlias. Of especial value to floriculturists is a full and classified catalogue of varieties of the dahlia, and selections for various purposes. The varieties are arranged alphabetically, and the characteristics of each are described.

La Cause Première d'après les Données Expérimentales. By Émile Ferrière. Pp. 462. (Paris: Félix Alcan, 1897.)

THIS volume is the third and last of a trilogy having for their object the demonstration of the unity of substance by means of established facts, *à priori* argument being excluded. In the first volume the unity of the laws of matter and energy throughout the universe was expounded; the second volume dealt with the physical, physiological, embryological, and pathological facts concerning life and mind; the present volume aims at explaining the relations between various forms of organic life, the order of appearance of animals and plants upon the earth, and evolution problems generally. Leaving the metaphysical side of the book out of consideration, the book contains a certain amount of readable information and criticism.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Acquired Immunity from Insect Stings.

MAY I beg to add a few lines to the very interesting correspondence and discussion regarding the immunity of man from insect-stings and snake-bites after successive inoculations. The letter of Dr. Dawson Williams, in NATURE of March 4, calls attention to a certain degree of immunity which obtains among the Norwegians from the stings of the myg, a kind of gnat (probably our midge, Anglo-Saxon mygge). His statements in regard to the degree of immunity varying in different individuals, is quite in accordance with our experience with the mosquito. His pathological description of the effects of the sting of the Norwegian myg would apply most accurately to the sting of the mosquito. We also become more or less immuned from the mosquito poison after much suffering in childhood. The swelling resulting from the mosquito sting will often close the eyes of an infant. In middle age the sting is hardly noticeable. English and Irish people, upon first coming to this country, suffer beyond measure, and often come under the care of a surgeon. It is a curious yet painful sight to see a brawny Englishman presenting the appearance of our young infants under the infliction of these pests. I have two Irish servants, who have been in this country two and seven years respectively. They both tell me that the mosquito bite, as it is called, no longer troubles them, though they were eloquent in the descriptions of their acute sufferings at the outset. More than a quarter of a century ago Dr. J. C. White, a distinguished dermatologist, of Boston, in a communication to the Boston *Medical and Surgical Journal*, November 9, 1871, discusses the subject fully in a paper entitled, "On the protection acquired by the human skin and other tissues against the action of certain poisons after repeated inoculation." He not only shows the immunity arising from the repeated stings of mosquitos, but notices a like immunity arising from the domestic pests, Pediculus, Cimex and Pulex. An American recalls his first experiences with the flea in Europe with the same horror that an Englishman remembers the welcome he received from the mosquito in America.

More than a century ago attention was called to the immunity enjoyed by natives to the sting of mosquitos. In the efforts of Great Britain to suppress the revolt in the American colonies, European troops were hired to augment their armies. Among these were the Anspach-Bayreuth troops, and this contingent was accompanied by an intelligent surgeon, Dr. Johann David Schoepll. His letters to Prof. Delius, of Erlangen, on the "Climate and Diseases of America," were published in pamphlet form in 1781. Dr. James R. Chadwick, of Boston, translated the pamphlet as being one of medico-historical interest. The following paragraph from these letters is of interest. The author says: "One fact is worthy of mention in this connection, which perhaps testifies as forcibly as anything can to the need of acclimatisation, and is moreover universally admitted to be true. In a new-comer, almost every bite of the mosquito produces a boil during the first year after his arrival, but fails to have this effect in the subsequent years."

EDWARD S. MORSE.

Salem, Massachusetts, March 22.

TO the query of Mr. Dawson Williams (NATURE, March 4, p. 415), as to whether the mosquito injects a toxin, an affirmative answer may be given. The mosquito has, instead of the two long simple salivary glands of other diptera, a complex system, three glands on each side of its thorax, two of each set unlike the third. All the six ductules from these glands unite so as to carry the secretion to the common salivary duct, and by it to the hypopharyx. The structure of the hypopharyx is the same as that of the sting of a bee, a tubular-pointed organ with a subterminal orifice. The only exit for the discharge of the complex glandular apparatus is into the wound made by the lancet-formed mouth-organs.

I have all this mechanism dissected out and preserved for

© 1897 Nature Publishing Group